

**This Page Is Inserted by IFW Operations
and is not a part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- **BLACK BORDERS**
- **TEXT CUT OFF AT TOP, BOTTOM OR SIDES**
- **FADED TEXT**
- **ILLEGIBLE TEXT**
- **SKEWED/SLANTED IMAGES**
- **COLORED PHOTOS**
- **BLACK OR VERY BLACK AND WHITE DARK PHOTOS**
- **GRAY SCALE DOCUMENTS**

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

1006677

Fig. 1

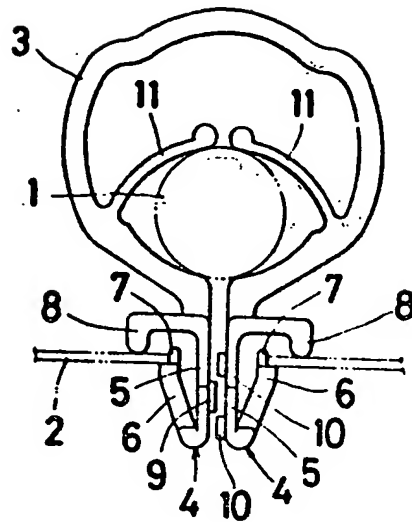


Fig. 2

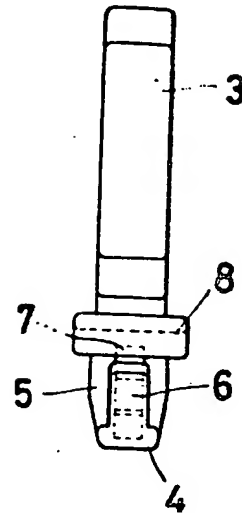


Fig. 3

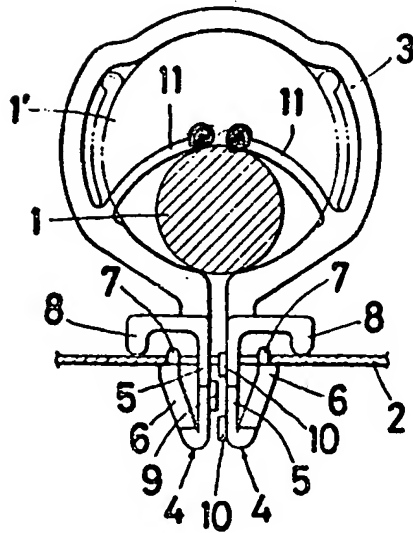
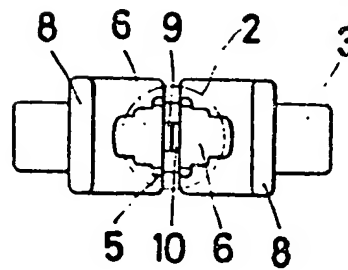


Fig. 4



NOV 1976

⑪ ④ No. 1000677

④⑤ ISSUED 761130

⑤② CLASS 248-66
C.R. CL

CANADA
GROUP 355
CLASS 248
RECORDED

⑪ ④

CANADIAN PATENT

⑤①

WIRE FASTENER

⑤①

Murayama, Hiroo,
Japan

Granted to Nifco Inc.,
Japan

⑤①

APPLICATION No. 195,344

⑤②

FILED 740319

⑤①

PRIORITY DATE Japan (55023/73) 730512

No. OF CLAIMS 2

A WIRE FASTENERDetailed Description of the Invention:

This invention relates to a plastic moulded device for fastening wires, hoses, rods and other elongated articles to a plate. The word, "plastic" used hereinafter refers to nylon, urethane, hard rubber and other such materials characterized by stiffness.

10 Fastener devices of this type hitherto known comprise an elongated belt whose opposite ends are formed in semi-conical shape, and in use a worker wraps the fastener belt around a wire, and then he inserts the opposite ends of the fastener belt into an associated opening of the plate, thus fastening the wire to the plate.

If a fastener belt as long as the circumference of the wire is not used, the wire cannot be positively fastened to the plate. If a fastener belt somewhat longer than the circumference of the wire is used, the wire will be loosely fastened to the plate. In this connection the worker must select a proper fastener belt from among those of a variety of lengths. This is tedious and time consuming work.

20

The object of this invention is to provide a plastic fastener device which permits positive and reliable fixing of wires of different diameters to a plate.

To attain this object there is provided a one-piece plastic device for fastening a wire or other elongated article in spaced relation to a complementary apertured plate which comprises an elongated belt having cooperating anchor portions integrally connected to each of the opposite ends thereof which are adapted to form a mounting stud when placed adjacent each other to mount the belt securely on the complementary apertured plate. Each of the anchor portions comprises a leg and a reversely bent portion, to each form a triangular shape together with an associated stay projection, and the adjacent surfaces of each of the anchor portions are provided with a plurality of interlocking protrusions which extend from the surfaces at axially spaced locations to

30



maintain the anchor portions against axial movement relative to each other during and after insertion into the complementary apertured panel with which the portions are adapted to cooperate. A stay projection is integrally connected to the opposite surface of the belt and in the vicinity adjacent to each of the anchor portions. Flap extensions are integrally connected to and project from the surface of the elongated belt on the side opposite the stay projection and equi-distant from each of the stay projections and extend in the form of curved cantilever arms. The flap extensions are adapted to engage a complementary elongated article and to resiliently engage it to prevent longitudinal movement relative to the surface of the belt with which it cooperates.

This and other objects and advantages of this invention will be better understood from the following description which is made with reference to the accompanying drawings:

Fig. 1 is a front view of an embodiment according to this invention.

Fig. 2 is a side view of the embodiment.

Fig. 3 is a similar view to Fig. 1, but showing the manner in which different wires are gripped.

Fig. 4 is a bottom view of the embodiment.

Referring to the drawings, particularly Figs. 1 and 3, 1 or 1' is a length of wire or hose to be fastened to the surface of a plate. More specifically, 1 is a wire of the minimum diameter, whereas 1' is a wire of the maximum diameter to be fastened by a fastener according to this invention. 2 is a plate to the upper surface of which a length of wire 1 or 1' is fastened. The opposite anchor ends 4 of a plastic annular band 3 are inserted into an aperture of the plate. The anchor ends 4 are formed in symmetric

belt portion 3 equi-distant from each of the opposite converging ends. These flap lengths extend inwardly from the inner surfaces of the annular belt portion in the form of a curved canti-lever. The flap length has an end portion which is made relatively thick for reinforcement. With this arrangement if a length of wire or similar elongated article is inserted in the annular space defined by the open-loop belt portion, the pair of flap lengths are yieldingly deformed around the wire, and then they resiliently wrap and hold the wire, thus preventing the longitudinal movement of the wire. In use, the pair of flap lengths are opened wider with the fingers, and then a length of wire is inserted in the space defined both by these curved flap lengths and by the lower semi-circular portion of the annular belt. The flap lengths are released and wrap around the wire and positively hold the same. As shown in Figs. 1 and 3, the opposite vertical sides of the annular belt are bulged crosswise, thus allowing the pair of flap lengths to retire in the opposite recess spaces and leave the maximum circular space when an attempt is made to insert a wire 1' as large in diameter as the circular space which would be defined by the annular belt if it were not bulged, as shown in Fig. 3 (broken line). As seen from the above, a wire fastener according to this invention is characterized in that it has a pair of flap lengths to wrap around a wire when inserted in the annular band portion of the wire fastener. This unique structure of the fastener device broadens the adaptability of the fastener device to wire and like objects of different diameters ranging from the minimum to maximum circular space which is defined by the resilient flap lengths together with the crosswise bulged annular band portion of the device. In use, a worker wraps a wire or like objects with the fastener device, and then he inserts the opposite anchor ends in the aperture of the plate. These operations can be performed

with one hand in a continuous and efficient way. The opposite anchor legs of the device to be inserted in an associated aperture of the plate constitutes the joint part of the device, and therefore there is no fear of separation at the joint portion of the fastener device when it is subjected to an external force, thus assuring positive and reliable fixing of a wire and like objects to a plate. In use, the flap lengths are yieldingly bent to accommodate a wire or other elongated object, and therefore as a result of the counter force generated in the annular portion of the fastener the opposite anchor ends tend to open wide in the aperture, thus causing the fastener device to positively catch the opening edge and further assuring positive and reliable fixing of the wire or other similar article to a plate.

15

20

25

30

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A one-piece plastic device for fastening a wire or other elongated article in spaced relation to a complementary apertured plate comprising an elongated belt having cooperating anchor portions integrally connected to each of
5 the opposite ends thereof which are adapted to form a mounting stud when placed adjacent each other to mount said belt securely on the complementary apertured plate, each of said anchor portions including a leg and a reversely bent portion to each form a triangular shape together with an associated stay
10 projection, the adjacent surfaces of each of said anchor portions provided with a plurality of interlocking protrusions which extend from said surfaces at axially spaced locations to maintain said anchor portions against axial movement relative to each other during and after insertion into the
15 complementary apertured panel with which said portions are adapted to cooperate, a stay projection integrally connected to the opposite surface of said belt and in the vicinity adjacent to each of said anchor portions, and flap extensions integrally connected to and projecting from the surface of
20 said elongated belt on the side opposite said stay projection and equi-distant from each of said stay projections and extending in the form of curved cantilever arms, said flap extensions adapted to engage a complementary elongated article and to resiliently engage it to prevent longitudinal movement relative
25 to the surface of the belt with which it cooperates.

2. A fastener device according to Claim 1 wherein said elongated belt has two recess portions formed therein and on the same surface of said belt from which said flap extends to accommodate said flap extensions in their maximum flexed
5 position when around a complementary elongated article of maximum size for the size said belt is adapted to engage.

